MULTIMEDIA UNIVERSITY

TABLE NO: | | |

STUDENT ID NO: | | | | | | | | | | |

VENUE: _____

MULTIMEDIA UNIVERSITY

FINAL EXAMINATION

TRIMESTER 2, 2019/2020

PSP0101 – PROBLEM SOLVING AND PROGRAM DESIGN

(All sections / Groups)

13 MARCH 2020
9.00 a.m. – 11.00 am
(2 Hours)

Question	Mark
1	
2	
3	
4	
Total:	

Examiner 1 Signature: _____

Examiner 2 Signature: _____

Examiner 3 Signature: _____

INSTRUCTIONS TO STUDENT

1. This Question paper consists of 9 printed pages (including cover page) with 4 Questions only.

2. Student must attempt **ALL QUESTIONS**. All questions carry equal marks (25 marks). The distribution of the marks for each question is given.

3. Please print all your answers **CLEARLY** in the specific answer boxes provided for each question. Submit this question paper at the end of the examination.
Note: User input in the examples given in all questions will appear like this: `123abc`

QUESTION 1 [25 Marks]

a) Write the most suitable data type to store each variable on the left hand side of the assignment statements below: [5 marks]

gameOver = True	
temperature = 45.3	
song = "O Baby"	

symbol = '#'	
teeth = 32	

b) Evaluate the following expressions.. [4 marks]

```
19 / 10 =
```

```
288 % 100 =
```

```
31 // 6 =
```

```
2 ** 3 =
```

c) Write the final results of the following statements. Show all your steps: [4 marks]

i) `(a < b) and (a < (b + a))` where `a = 1, b = 1.5`

ii) `8/2 == 4 and (not ("9" > "56" and 9 > 56))`

Continued...

d) Convert the following into Python statements: [4 marks]

i) $x^2 + y^2 + 2xy$

ii) $3 + \frac{2x-4y}{-9}$

e) Write pseudocode for the following: [8 marks]

A program to accept two numbers and output the largest one:

A program to accept a positive integer N and display all integers from N to 1:

Continued...

QUESTION 2 [25 Marks]

a) The number of calories burned per hour by cycling, running, and swimming are 200, 500, and 300, respectively. A person loses 1 kg of weight for each 4,000 calories burned. Write a program to request the number of hours spent at each activity and then display the number of kgs worked off. Write a Python program that will allow a user to input his weekly hours in doing these exercises and then output the total calories burned and the weight loss resulted. [10 marks]

Sample run 1:

```
Cycling hours = 8
Running hours = 10
Swimming hours = 5
Calories =  8100
Weight loss =  2.025
```

Sample run 2:

```
Cycling hours = 2
Running hours = 7
Swimming hours = 6
Calories =  5700
Weight loss =  1.425
```

b) Draw a flowchart for a program will ask the user for how many numbers to input, and then input those numbers and lastly output the largest and smallest number among them. [15 marks]

Sample run:

```
How many numbers to input: 7
Enter numbers: 9 6 12 80 33 7 5
Largest:  80
Smallest: 5
```

Continued...

Flowchart:

Continued...

QUESTION 3 [25 Marks]

Mall-Mart Supermarket is having a grand sale this month. Items with tags in yellow will be given a discount of 10%, green tags at 30% discount, and red tags at 50% discount. Goods with no colour tags will be sold at full prices. Customers who have a membership card will be given a further discount of 10% from the discounted price, and customers who use a Visa card to pay will be given a further 5% discount from the discounted price. If a customer has both the membership card and Visa card, only one further discount can be given (the higher rate between the two will be chosen).

i) Write a function called `checkDiscountedPrice` that receives an item's price and the color of the tag, then returns the discounted price. [10 marks]

ii) Write a full program with a `main` function that will use the `checkDiscountedPrice` function created above to calculate the final selling price for an item. [15 marks]

Sample run 1:

```
Price              = 1000
Color (Y/G/R/N)    = R
Discounted Price   = 500.0
Member card (Y/N)  = Y
VISA card (Y/N)    = Y
Final Price        = 450.0
```

Sample run 2:

```
Price              = 200
Color (Y/G/R/N)    = N
Discounted Price   = 200.0
Member card (Y/N)  = N
VISA card (Y/N)    = Y
Final Price        = 190.0
```

Write your answer below:

Continued...

Answer for Q3:

Continued...

QUESTION 4 [25 Marks]

a) By using loops, write the code to generate the following patterns: [8 marks]

Hint: Use `end=""` in the print statement if do not want to print newline.

Sample run 1:
```
Input lines: 5

0
01
012
0123
01234
0123
012
01
0
```

Sample run 2:
```
Input lines: 4

0
01
012
0123
012
01
0
```

```
n = int(input("Input lines: ")
```

b) Given the list below, write the code to sum up all the even numbers: [4 marks]

```
score = [4, 2, 5, 8, 0, 6, 9, 1, 2]
```

Continued...

b) The natural logarithm (with base *e*) can be expressed in a series:

$$f(x) = x - \frac{x^2}{2} + \frac{x^3}{3} - \frac{x^4}{4} + \cdots$$

Draw a flowchart to calculate the value of *f(x)* to include the first 60 terms of the above series. Your design must NOT use any power, factorial, or other math functions, instead, you should apply the incremental technique: use the value of the previous term (T_{n-1}) to calculate the value of the current term (T_n). [13 marks]

Flowchart:

End of Questions.